

Study finds that dopaminergic medication improves sleep quality in Parkinson's disease patients

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A study involving 22 Parkinson's disease (PD) patients has shown that use of the dopaminergic drug levodopa improves sleep quality. When the

patients took the drug, the number of times they woke up during the night fell 25% and the amount of time they remained awake fell 30% on average.

An article reporting the results is [published](#) in the *Journal of Sleep Research*.

The sleep-wake patterns of PD patients were monitored during four nights with the aid of a wearable actigraph, a wristwatch-like sensor that detects movement. The volunteers were evaluated for three nights after taking the drug and one without it. Curiously, subjective information provided by the PD patients did not suggest any difference in [sleep quality](#) with and without the drug, in contrast with the actigraphy results.

"This was the first study to evaluate the effects of the drug on sleep quality in PD patients objectively [using equipment] and to compare them with the results reported subjectively. The actigraphic readings pointed to an improvement in sleep quality after the patients took the drug, although they themselves didn't experience any benefit.

"This is important from the standpoint of clinical care. Clinicians should take these findings into account when deciding whether to administer levodopa to PD patients before they go to bed at night," said Fábio Barbieri, last author of the article. He heads the Human Movement Research Laboratory (MOVI-LAB) and runs a project called "Ativa Parkinson" offering patients physical activities on UNESP's Bauru campus.

For Barbieri, the discrepancy between the objective and subjective results should not be a surprise. "The perceptions of PD patients are impaired by the disease. The number of waking episodes was ten per night on average, so it's understandable that they failed to report any improvement. That's why it's important to take the actigraphic

measurements into consideration," he said.

Levodopa and other dopaminergics are first-line therapeutics for motor symptoms of PD such as tremors and shaking at rest. There appears to be a link between these symptoms and nocturnal waking episodes since the dopaminergic system also plays a key role in sleep regulation. Substantial changes in dopamine levels are known to occur as the brain progresses through the [sleep-wake cycle](#), for example.

Although dopaminergic medication may also improve sleep quality by reducing sleep onset latency (the time taken to fall asleep) and wakefulness in PD patients, there are documented reports of potential sleep disturbance exacerbation resulting from treatment with levodopa. It bears recalling that the drug should be used only when prescribed by a physician. Possible side effects include confusion, drowsiness, insomnia, nightmares, hallucinations, delusion, agitation, anxiety and euphoria.

According to Barbieri, about 90% of PD patients exhibit disturbances such as insomnia, daytime drowsiness and restless leg syndrome, for example. Research has shown that sleep quality is associated with improved early morning mobility and cognition in PD patients.

"Hence the importance of our objective analysis using equipment. It was necessary to verify the impact of the [drug](#) on sleep realistically. We concluded that going to bed without the fourth dose was worse," he said.

Sleep and mobility

Impairment of sleep quality is also associated with freezing of gait—a sudden inability to initiate or continue movement, often resulting in a fall, and one of the most incapacitating symptoms of PD.

In a [systematic review](#) of 20 studies, an international group of

researchers found that PD patients wake up several times during the night, feel sleepy during the day, and have REM sleep behavior disorder. Rapid eye movement (REM) sleep plays a role in the maintenance of many cognitive processes.

Another study conducted by Barbieri and his group used [artificial intelligence](#) to estimate spatial and temporal gait parameters as a basis for precise clinical diagnosis and determining the stage reached in progression of the disease.

This latest study evaluated parameters such as step length, width and velocity, as well as consistency (or width variability). The data is available online for use by other research groups.

More information: Elisa de Carvalho Costa et al, Sleep "ON", sleep better! Positive effects of levodopa on sleep behaviour in people with Parkinson's disease, *Journal of Sleep Research* (2024). [DOI: 10.1111/jsr.14240](#)

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